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Economic Growth and Cycles in Poland, Hungary, Czech Republic, Slovakia and Slovenia: A comparison with Spain, Austria and other EU countries, 1950-2002

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Abstract

We present an international comparison of economic development of 5 Central European countries, with special reference to Poland and Hungary, with some European Union Countries for the period 1950-2002. We analyse different stages of their evolution: 1) In 1950-60 the evolution of production per inhabitant and rates of growth of this variable, in comparison with Spain, where very alike. 2) In 1960-75 the differences increased dramatically in favour of Spain. 3) In 1975-85 the differences diminished with a better performance of Hungary in comparison with Poland. 4) In 1985-91 the differences in the evolution of economic development increased again in favour of Spain. 5) Since 1991 to 2002 the evolution of these Central European countries generally improved and their rates of growth were more similar to those of Spain. We analyse the main factors that have explained the lower average rate of growth of production per inhabitant in Central Europe as a whole in comparison with Spain, Austria and other EU countries. We focus on human capital, manufacturing capacity, foreign trade and other relevant factors of production, mainly from a supply side approach. We also analyse the differences among Central European countries, outstanding the special case of Slovenia, country which has reached a position very similar to that of Spain in the level of income per inhabitant.

Key Words: Growth, Development and Cycles in Central Europe

JEL Classification: C5, C51, O52, O57

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1. Introduction

We analyse the relation between economic growth and cycles in the five Central European countries which have joined European Union, EU, in the year 2004 enlargement: Poland, Hungary, Czech Republic, Slovakia and Slovenia, comparing the evolution of these countries during the period 1950-2002 with Spain, Austria and other EU countries, with main emphasis on the role of industry to explain both economic development and cycles.

Although the index of industrial production is considered by several authors a coincident indicator with Gdp for economic cycles, because the close causal relation between both variables acts almost instantaneously, we should have into account that the response or the lack of response from the supply side to the demand side impulses is generally the main cause of upwards and downwards movements in economic growth and development.

The main emphasis of this study is to present an international comparison of Central European countries with Spain and other EU countries which had similar levels of development around 1950 and which have got higher levels of real Gdp per inhabitant, and analyse the main causes of these difference during the second half of the 20^{th} century, with special emphasis on the recent evolution and the convenience to foster European cooperation with Central and Eastern European countries in order to achieve convergence to EU averages of income per inhabitant and to improve economic well-being.

Section 2 presents a summary of some relevant literature related with economic growth and cycles in those countries. Section 3 presents a comparative analysis of growth and development of the five Central countries, CC, with other EU countries, related with the evolution of real Gross Domestic Product, Q90, real Value Added ofIndustry, QI, and Foreign Trade variables at constant prices. Section 4 analyses the role of manufacturing and foreign trade in explaining economic fluctuations and growth by means of cross correlations and some econometric models. Finally section 5 presents the main conclusions.

As other researchers working on this topic we have found many difficulties of unavailability of data for many variables in Central Europe prior to 1990, so we have made some provisional estimations of some variables needed to analyse the evolution during the period 1950-1990. For the period 1990 the main source of data is OECD National Accounts, and for the previous years we have used several sources when available (Maddison´s estimations on line, World Development Indicators, and our own estimations based in the assumption of constant or variable evolution of some ratios.

2. Some recent economic research: economic growth and cycles in Central Europe

Among many interesting bibliographical references written in English about development and cycles in Central Europe, we mention here only a few recent studies which are related with the main focus of this research which is the role of industrial

development in explaining the different evolution of countries, specially when those studies are based on industrial data, and the comparison among several countries.

Estrin and Urga(1997) analyse the convergence in Output in transition economies of Central and Easter Europe during the period 1970-95, by means of a cointegration anaylisis. They compare the development of real GDP per capita in the 26 transition countries including the 15 countries of the former Soviet Union with 4 Western data series covering Germany, the USA, the OECD and the European Community of 12 countries, EC12, and found no evidence of convergence either within the block nor between the block and the west and conclude that policies to equalise income within the block where not successful and that the block as a whole failed to catch up with the West, presumably for reasons related to failure of information and economic incentives, particularly within the enterprise sector. The main data where obtained from United Nations, World Bank and national sources.

Bivand and Steineke(1998) present an study about regional manufacturing development in Poland, before and after 1989. Lehmann and Schaffer(1995) analyse productivity, employment and labour demand in Polish industry in the 1980s, from a panel of 334 industrial enterprises, and found general excess supply of employees as the marginal product of labour exceeds the wage paid by the enterprise by a considerable margin.

Jaroslav(1998) presents a comparison between Czech Republic, Hungary and Poland about the situation of economic growth and inflation in those countries, and Bonin and Wachtel(1999) present an interesting study on bank privatization in Central Europe, comparing the different approaches followed in Hungary, Poland and the Czech Republic.

Mencinger(1995) present a general view of Slovenia after independence in 1991. He analyses the process of independence together with the transition changes, stating that political and social environment in former Yugoslavia became and unsurmountable barrier for systemic changes and sound economic policies, so transition would imply important benefits for the Slovanian development.

Paci, Sasin and Mohib(2004) present a comparative study of growth-poverty in Poland and Russian during the periods 1994-98 for Poland and 1999-2002 for Russia, analysing the different strategies of both countries for transition, with Poland´s growth led by small and medium-size enterprises and Russia´s receent growth led by the recovery in the energy sector. They found that poverty was reduced in both countries. In the case of Russia they conclude that there was an impressive reduction on poverty but there was an increase in income and regional inequalities.

Nijsse and Sterken(1996) analyse shortages, interests rates and money demand in Poland 1969-1995, analysing the problem of disequilibrium between supply and demand in consumer goods markets in centrally planed economies, with shortage of supply as the general rule, and the follow a disequilibrium approach as proposed by Barro and Grossman, Portes and other authors. The absence of an official capital market led to a variety of secondary markets but was not enough to foster the increase of production in order to reach the market equilibrium and increase industrial production.

They use some simple indicators to measure shortage in the Polish economy for the period 1969-1995 such as the ratio of the free market food price index to the official food price index, and analyse the long-run household demand for money by means of cointegration vectors, testing for the stability of those vectors by means of the tests of Chow, Quand and Hansen, and out-of sample forecasting ability, in a two equations model where money demand is a function of household real income, shortages, interest rate and the prices rate of increase, and household real income is a function of money demand and the other exogenous variables in the model (shortages, interest rates and prices rate of increase). They also analyse the short run money demand equation by means of Error Correction models. They found that the evidence presented suggests some implications for the monetary adjustment and stabilization policy of the National Bank of Poland as carried out from implementation of the Balcerowicz Plan onwards. They found that the policy of positive real interest rates was from the beginning of 1989 an important element of monetary policy.

Fidrmuc and Fidrmuc(2000) analyse macroeconomic development in the Czech Republic and the EU Accession Process, and present a comparative analysis of actual and forecasts average growth rates for transition economies in 1994-98, as well as actual growth rates for 1990-1998 and forecasts for 1998-2004. They analyse the actual and forecasted evolution of some macroeconomic indicators for the Czech Republic for 1990-2010, although the indicators presented do not include production by sector, and present data of foreign trade only from 1994 onwards.

Wyplosz(1999) present a comparative study of the 5 Central European countries which joined the EU in 2004 with other 10 transition economies, including the 3 Baltic countries and Russia, with special reference to unemployment rates and average real wages.

Matkowski(2004) presents an interesting book of studies of several authors related with economic fluctuations and business cycle indicators in Poland, where industrial production appears as an important indicator. Some of these studies found that the indicator of industrial production is coincident and not a leading one, but the Business Tendency Survey, BTS, is a good leading indicator, with 1 to 3 months lead, what makes it interesting to forecast. This author remarks the difficulties to isolate the effect of industry and trade on economic growth and fluctuations and remarks the importance to foster research on inter-sector relationships to get a deeper appraisal of the different causes of economic fluctuations. In the same volume Zarnowitz(2004) insist upon the convenience to have into account endogenous sources of cycles and the supply and demand sides, Kröger, Sdrakas and Veguie(2004) analyse cyclical convergence in Euro Area, and Matkowski and Próchniak(2004) analyse economic convergence in the EU accession countries, founding a slight trend to real convergence among the 5 Central European countries and the 3 Baltic states.

Frias and Iglesias(2004) present a general comparison of several economic variables between the new 15 countries of 2004 Enlargement with the 3 countries of 1986 Enlargement and conclude that the 2004 access is generally in better conditions than that of 1986. The access was very positive for the 3 countries of 1986 Enlargement: Spain, Portugal and Greece, and these authors hope that a similar evolution is been expected for the 15 new EU countries which joined in 2004.

Guisan and Aguayo(2004a) analyse economic cycles in Central Europe, Eastern Europe and Eurasia, and present some econometric models for Poland and Russia, in comparison with Spain, which show a high degree of correlation between actual economic fluctuations and those forecasted by the models.

A general view of these and other related studies show that the lack of responsiveness in the past from state controlled industries to the needs of the market has generally been the main cause of economic stagnation and low rates of growth in many countries of Central and Eastern Europe formerly under communist or socialist systems. Transition has many difficulties but the perspectives are generally positive and the five countries of these study could get a path of development similar to that of Spain, Austria and other EU countries if they are successful to increase industrial development, tourism and other activities which have an important inter-sectoral impact on economic development at national and regional level, as it has been pointed out in many studies of OECD countries.

A very interesting study by Viachoutsicos(1998) critizes the decision-making process of the Soviet enterprise as a traditional characteristic of "russian communitarianism" which do not allow properly the flexibility to innovate and reach the market demand, and the question is if that type of decision-making process based not only in collective decision inside the firms but also in excessive bureaucratic controls and delays from outside, remains in the style of organization of other former communist countries. As those countries have generally a high educational level of population it is of uppermost importance to improve social and cultural changes to update the decision-making process to make it more innovative, flexible and efficient.

Regarding the evolution of population and foreign transfers we should have into account the perspectives of emigration from the 5 countries of this study, particular from those with lower income per inhabitant, to more developed countries in European Union, particularly to Germany. In this regard it is interesting the study by Krieger and Sauer(2003). The foreign transfers from emigrants could have a positive effect in the capacity to import goods necessary to increase real value-added of manufacturing and non-manufacturing sectors, and thus it will be very useful as it has happened in the cases of Spain, Greece and Portugal during the last decades of the 20th century. We will analyse this question in section 4, where our econometric models show the important role that imports generally have to increase the supply side of manufacturing and non-manufacturing sectors.

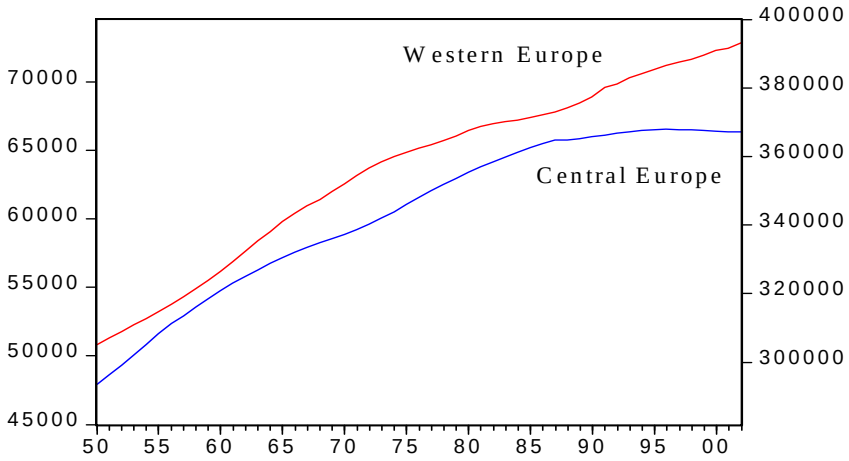
3. Economic development in Central and Western Europe in the period 1950-2002

First of all we present a general comparison based on Statistics from several sources: OECD, World Bank, Summer and Heston, and Maddison, amongst other, and our own estimations, based on these sources, for non available data.

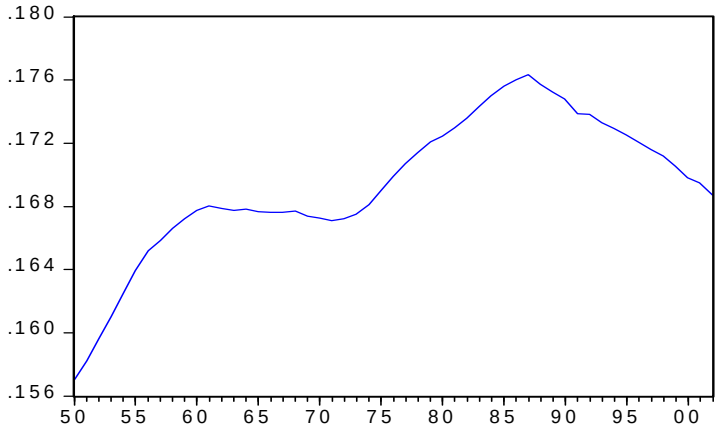
Graphs 1 and 2 present the evolution of population of the group of 5 Central European countries: Poland, Hungary, Czech Republic, Slovakia and Slovenia, during the period 1950-2002, in comparison with Western European countries, according to data from Maddison(2001) and (2004). Graph 1 has a dual scale, with the left one corresponding to Central Europe and the right one to Western Europe. Population is measure in thousand inhabitants.

For the period 1974-88 we notice and increase in the ratio between population of Central Europe and Western Europe, and a decline afterwards, due mainly to migratory movements, while the population of Central Europe experienced and stagnation due to emigration, the population of Western Europe experienced an increase due to immigration. A key question to avoid diminution of the ratio of population between Central and Western Europe is to get a faster convergence in real income per inhabitant in Eastern countries.

Graph1. Population of Central and Western Europe, 1950-2002
(thousand inhabitants)

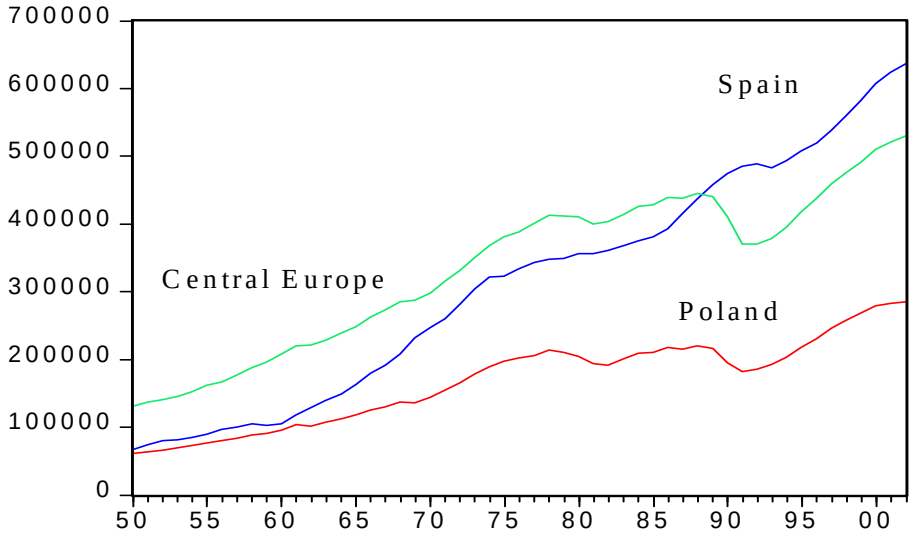


Graph 2. Ratio between the population of Central and Western Europe



Graph 3 shows the evolution of real Gdp in Poland and the group of 5 Central European countries in comparison with Spain, and graph 4 show the evolution of real Gdp per inhabitant in each of those countries. Data sources are Maddison(2001) and (2004) and values are expressed in million dollars at 1990 prices and Purchasing Power Parities.

Graph 3. Real Gross Domestic Product in Central Europe and Spain
(million dollars at 1990 prices and PPPs)



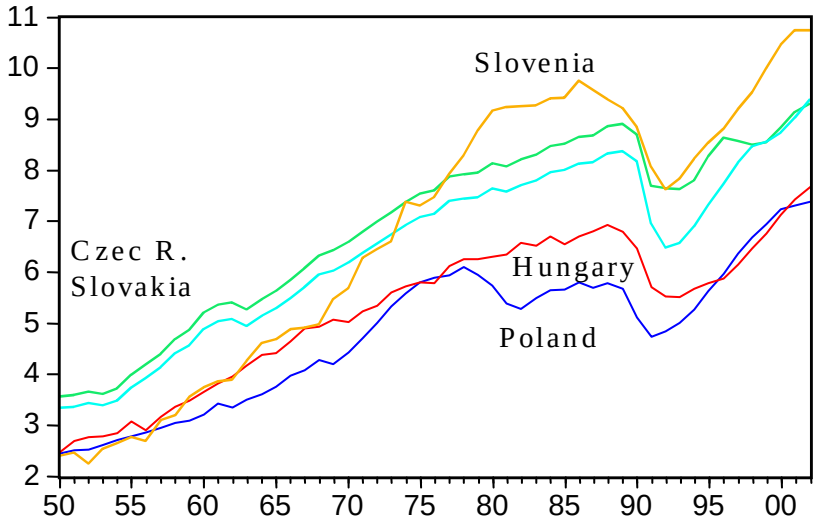
While in 1960 Spain had a value of real Gdp very similar to Poland, in 1988 Spanish Gdp reached a value similar to the 5 Central European countries together, and higher values for 1989-2002. Since 1990 economic development has been faster in Poland than in the total of the other 4 countries of Central Europe.

The comparison of Poland with Spain is very interesting, in our view, because they are two countries with similar size of population and around 1950 they had similarly low levels of industrialization and income per inhabitant, and thus we can make interesting comparisons and find the main factors that explain the different evolution in order to recommend positive measures to improve economic policies in Central Europe based on the experience of Spain, Ireland and other Western European countries which have had a faster economic development during the last decades of the 20th century.

The comparison among Central European countries in graph 4 shows that Slovenia, similarly to former Yugoslavia, experienced a high degree of development during the period 1956-1987, reaching since 1978 the highest position in real Gdp per inhabitant among these 5 Central countries. The political crisis of former Yugoslavia and the transition to the new democracy and market system caused a decrease in real Gdp per inhabitant in the period 1987-92 but this country has shown an important recovery for the period 1992-2002. The Czech Republic and Slovakia had the highest values of real Gdp per inhabitant among 5 Central countries at the beginning of the period 1950-2002 but they where overcome by Slovenia because the economic policies in this country showed to be more effective, with highest increase in industrial investment, among other factors. Regarding Hungary and Poland those countries had very similar level in 1950 although Hungary showed a better evolution for the period 1950-1969. In 1969-1978 Poland experienced a higher rate of growth of Gdp per inhabitant reaching the level of Hungary at the end of that period. In 1978-91 the real Gdp of Poland lost its positive trend, with an small recovery in 1981-89, and Hungary

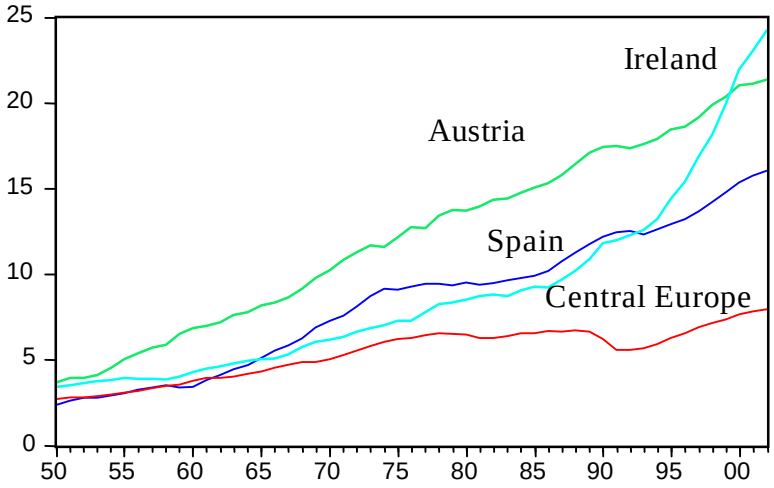
got a superior position again. In the post-socialism period both countries experienced a positive trend and Poland reached again a level similar to that of Hungary.

Graph 4. Real Gdp per inhabitant of 5 Central European countries



Graph 5 shows the evolution of real Gdp per inhabitant of Central Europe in comparison with two Western countries, Spain and Ireland, which had similar levels of this variable to Central Europe in 1950-65, and with a more developed country in that period: Austria.

Graph 5. Real Gdp per inhabitant in Central and Western countries, 1950-2002
(thousand US dollars at 1990 prices and PPPs)

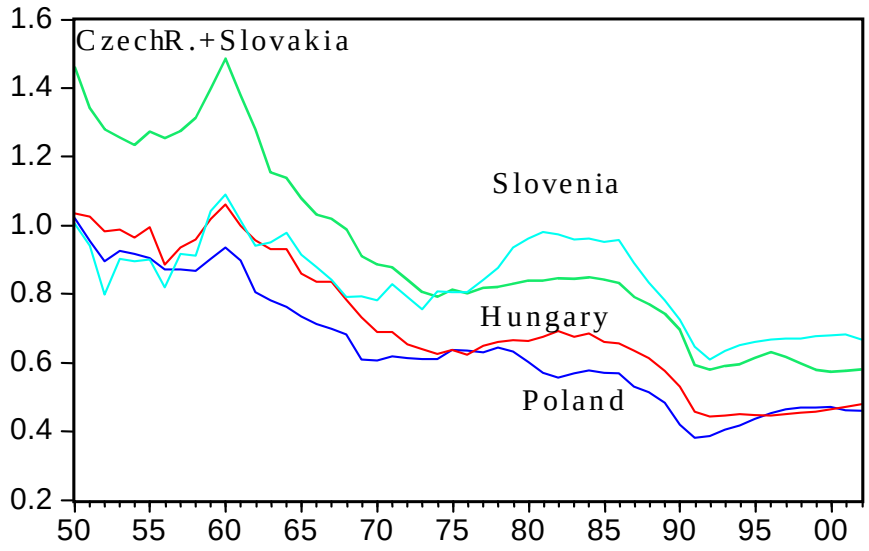


The highest rates of economic development in Spain and Ireland, in comparison with Central Europe, were due at a great extent to the following factors: education, industry and foreign trade. The increase in the educational level of population has been also a feature of Eastern Europe, although with lower levels of expenditure per

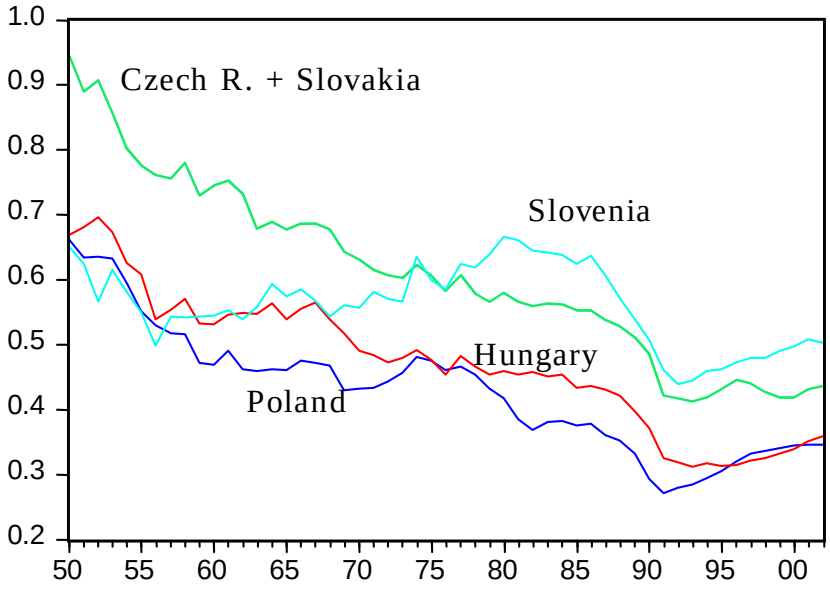
inhabitant in education and research according to the available data, but industrialization did not reach for the moment a similar level than in Western Europe.

Graphs 6 and 7 show the ratio between real Gdp per inhabitant in Central European countries in comparison, respectively, with Spain and Austria.

Graph 6. Ratio of Gross Domestic Product at PPPs in comparison with Spain



Graph 7. Ratio of Gross Domestic Product at PPPs in comparison with Austria



Those graphs show that the Czech Republic and Slovakia, experienced during the period 1950-91 a clear lost of their relative position with regard to those of Spain and Austria. Slovenia experienced some stages of small decrease and some of increase of its relative position. Hungary and Poland showed a constant ratio, next to 1, in

comparison with Spain for 1950-60, a clear decrease in the ratio after the new economic policies of Spain since 1960 until 1975, a constant ratio in relation with this country during the period 1975-85 of oil crises and high prices of energy, a decrease during the period 1985-91 and again a trend to a slight increase in the ratio for 1991-2002.

It is clear that the slight trend to increase the ratio of real Gdp per inhabitant in Central European Countries during the post-socialist period is not enough to get a fast convergence with European Union standards of living. So it is interesting to analyse the role of industry, foreign trade, human capital, improvement of agrarian income per worker and other factors which are very much related with the economic development of Spain, Ireland, Austria and other EU countries.

In the next section we present some econometric models which show that it is important to foster industrial development and the capacity of supply to answer to the signals from the demand side in Central European countries. In this regard foreign trade could be a constraint to development in the case of a low level of exports of goods and services, but fortunately Central European countries had experienced a positive evolution during the last years of the period here analysed and thus they can afford to import more raw material and intermediate goods needed to improve their industrial production.

One of the first questions to decide in international comparisons is the choice between exchange rates and purchasing power parities in order to express foreign trade values, because sometimes there are important differences among both methods. Graph 8 shows for example the comparison of Imports of goods and services of Poland with Spain, according to both methods, and we see that while the difference in dollars at exchange rate is very big the difference at purchasing power parities is very small. The variables with name finishing in PP are measured in Purchasing Parities, according to data from OECD statistics and some complementary sources.

Graph 8. Comparison of real Imports of goods and services: Poland and Spain (million dollars at 1990 prices, data at exchange rates and PPPs)

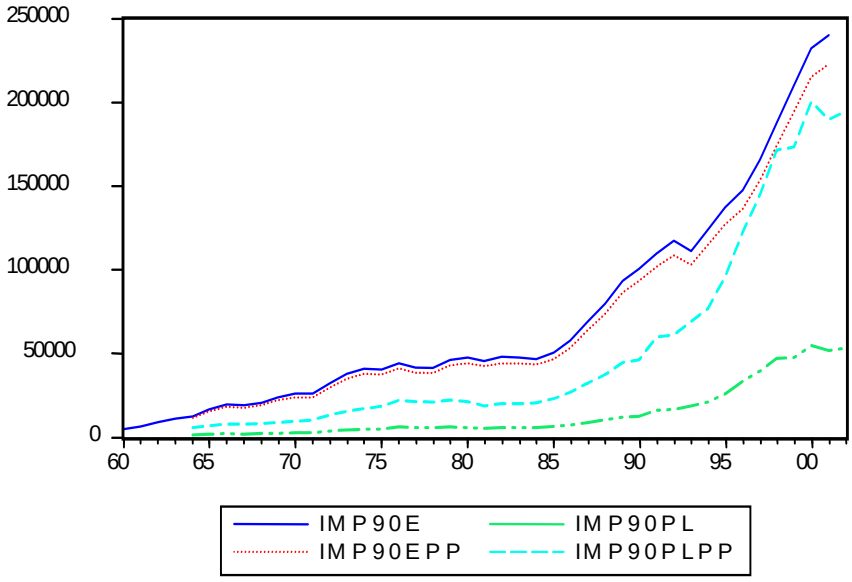


Table 1 present the evolution of real value-added in Industry, QI, real value-added in non-industrial sector, QNI, and Imports of goods and services, in billion dollars at 1995 prices and exchange rates for the group of 5 Central European countries in comparison with Spain. The main data source is OECD for years with available data and our own provisional estimations based on some complementary sources for the other years.

Table 1. Real Value-Added of Industry and Non-Industrial Sectors, and Imports in Spain (ES) and 5 Central Countries (CC5): Bn US$ at 1995 prices and exchange rates

Year	QIES	QNIE	QICC5	QNICC5	IMPES	IMPCC5
1970	47.836	227.098	29.917	157.119	27.704	23.296
1975	67.470	292.135	49.968	188.681	43.311	41.066
1980	74.971	321.376	53.616	203.974	51.168	49.983
1985	76.460	347.420	60.675	207.659	54.292	48.508
1990	93.637	434.404	66.683	190.773	107.940	61.449
1995	99.720	464.708	71.334	190.370	147.397	97.829
2000	121.367	554.640	91.913	227.435	249.133	185.412
2001	123.124	572.103	92.295	233.897	257.902	193.341
2002	124.393	585.034	92.378	240.821	262.444	201.727

Note: Source OECD and own elaboration from several international sources. Imports, Imp, and real value-added in Industry QI, and non-industrial sectors, QNI, in billions dollars of 1995. Variables for Spain end in ES and for 5 Central countries in CC5.

We notice that industrial production in Central countries in the year 2002 was similar to that of Spain in 1990, but non-industrial sectors presented lower levels in Central countries in comparison with Spanish values. The comparison with data expressed according to the purchasing power parities, PPPs, approach would be more favourable for Central Europe.

The tables presented in Guisan and Aguayo(2003) and (2004) show low values for industrial production per inhabitant in Central European Countries in comparison with Spain, Austria, Ireland and other Western European countries, both measured at exchange rates or at PPPs. For example for the case of Poland in the year 2000 real value added per inhabitant of manufacturing was 1.28 thousand dollars at 1990 prices and exchange rates, while Spain show a value of 3.546 dollars of 1990. The value for Poland at exchange rates in the year 2000 is lower than the value for Spain in 1964.

Table 2 presents the evolution of real Gross Domestic Product per inhabitant in Central Europe in comparison with some countries of Western Europe and the USA, according to the estimations by Maddison(2001) and (2004), and our provisional estimations for Czech Republic, Slovakia and Slovenia for year with unavailable data in those sources. Data are expressed in Purchasing Power Parities, PPPs.

These data show that it should be convenient to have into account economic policies which have been successful in Western Europe, the USA and other areas to improve economic development in Central and Eastern Europe, because countries with the same levels of Gdp per inhabitant can evolve very differently if they have different economic policies.

Table 2. Real GDP per inhabitant in Central Europe, Western Europe and the USA
(thousands of dollars at 1990 prices and PPPs)

Country	1950	1960	1970	1980	1990	2000
Czech R.	3.561	5.199	6.585	8.137	8.689	8.837
Hungary	2.480	3.649	5.028	6.307	6.471	7.131
Poland	2.447	3.218	4.428	5.740	5.115	7.228
Slovakia	3.347	4.887	6.190	7.649	8.168	8.736
Slovenia	2.410	3.742	5.700	9.158	8.848	10.456
Central Europe	2.723	3.781	5.064	6.476	6.226	7.679
Spain	2.397	3.437	7.291	9.524	12.210	15.367
Austria	3.706	6.864	10.246	13.746	17.459	21.030
Ireland	3.446	4.279	6.200	8.541	11.825	21.981
Western Europe	4.594	6.930	10.297	13.226	15.988	18.910
USA	9.597	11.328	15.030	18.575	23.221	29.403

Source: Maddison(2001) and (2004) and own elaboration.

We think that European Union should develop policies closer to the citizens demands, both in Western and Central Europe, fostering an harmonic development of all European countries and regions, and being something more that a common market, as to say an space of cooperation to improve development and social well-being. European citizens are very critic at this moment with EU institutions, according to international opinion polls, and there is a need for a change in the aptitudes of the main European institutions to improve their relations with European citizens. In this particular regard it should very interesting a higher support from EU institutions to cooperation among Economics researchers of different countries and regions having into account multilingual differences, particularly in subjects related with European development and international cooperation.

Regarding convergence we can notice that sometimes the ratio between Gdp per inhabitant of less developed areas and more developed ones has increased along time but the difference in the values of the variable has grown in favour of the richest ones. So Western Europe has changed from 48% of real Gdp per inhabitant of the USA in 1950 to 64% in the year 2000, but the difference among both areas was only 5 thousand dollars in 1950 and has increased to 10.5 thousand dollars in year 2000.

4. Econometric Models of the Impacts of Industry and Foreign Trade

Here we present models with variables expressed in dollars at constant prices and exchange rates. Both the models here estimated and those presented in other studies, such as Guisan and Aguayo(2004a), with data measured in purchasing power parities, show the positive impact that industrial production has on services and other non-industrial sector and the positive effect Imports generally have as a complementary factor of production. Of course there are imports that have substitution effects but the overall impact usually is positive with more weight of complementary relationships of imports with domestic production.

Model 1 presents the estimation of a relation between real Value-Added in non-industrial activities, as a function of real value-added in industry and real Imports, with a pool of annual data of the 5 Central countries in the period 1991-2002. Model 2 shows the positive effect that imports also have in the evolution of real Value-Added in Industry, QI. The data soruce is OECD(2003) for all countries but Slovenia where we used data from World Bank(2004).

Model 1. Equation for QNIH with a pool of 5 Central countries, 1991-2002

Dependent Variable: QNIH?
Method: Pooled Least Squares
Sample: 1991 2002
Included observations: 12. Number of cross-sections used: 5
Total panel (balanced) observations: 60
White Heteroskedasticity-Consistent Standard Errors&Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
QIH?	1.210453	0.374636	3.231007	0.0021
IMPH?	0.134133	0.057350	2.338863	0.0231
Fixed Effects				
PL--C	1386.112			
HU--C	1803.568			
CZ--C	1018.652			
SK--C	1146.928			
SN--C	2081.220			
R-squared	0.908232	Mean dependent var		3577.002
Adjusted R-squared	0.897843	S.D. dependent var		1041.665
S.E. of regression	332.9372	Sum squared resid		5874901.
Log likelihood	-429.8920	F-statistic		87.42361
Durbin-Watson stat	0.306032	Prob(F-statistic)		0.000000

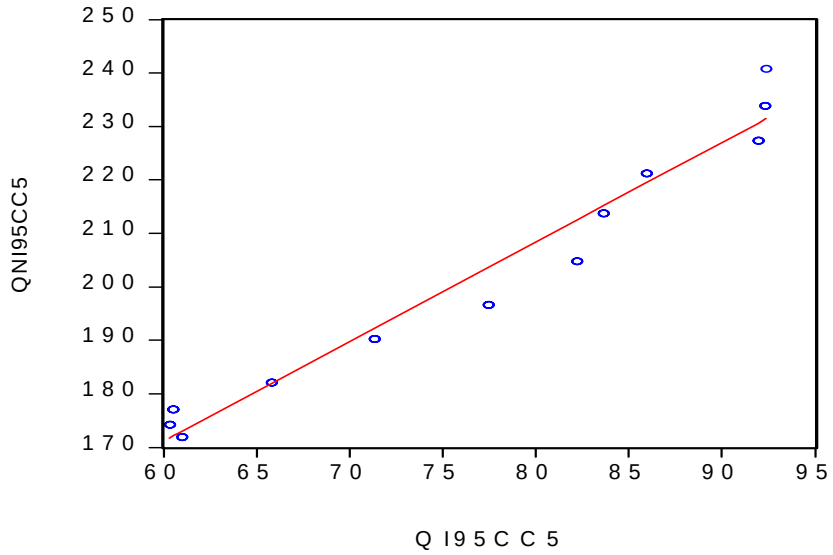
Model 2. Equation for QIH with a pool of 5 Central countries, 1992-2002

Dependent Variable: QI?H				
Method: Least Squares. Sample 1992-2002. 5 countries.				
Included observations: 55				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
QI?H(-1)	0.995254	0.009390	105.9958	0.0000
D(IMP?H)	0.167857	0.037223	4.509442	0.0000
R-squared	0.966309	Mean dependent var		1.409597
Adjusted R-squared	0.965673	S.D. dependent var		0.450651
S.E. of regression	0.083494	Akaike info criterion		-2.092394
Sum squared resid	0.369478	Schwarz criterion		-2.019400
Log likelihood	59.54084	Durbin-Watson stat		2.382319

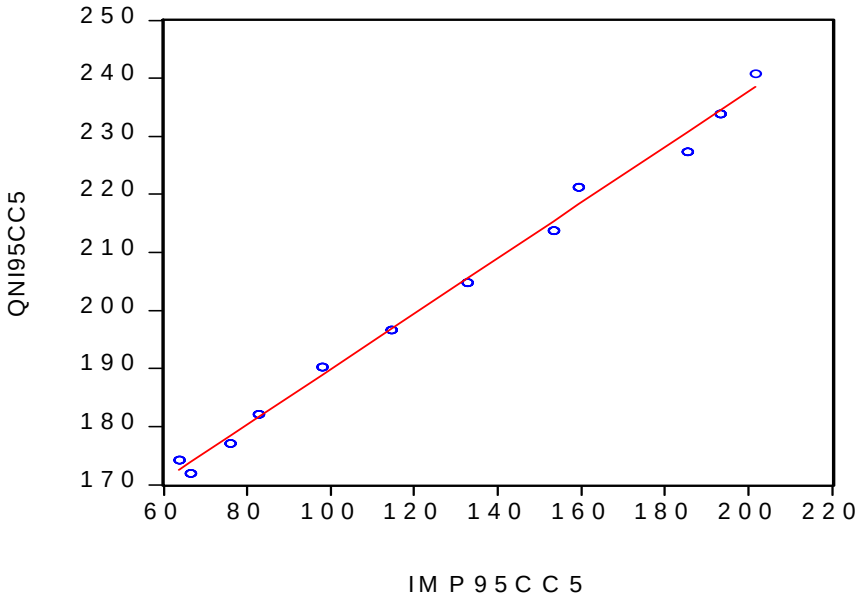
These models show a positive and significant coefficient of Industry and Imports on Non-Industrial Activities. These results are coherent with other found in the bibliography on similar relations for OECD countries and non-OECD countries. There is autocorrelation in model 1 which could be probably due to the effect of some missing explanatory variables.

Graphs 9, 10 and 11, show the important positive relationship between QNI and QI in Central countries, CC5, as well as between QNI and Imports and QI and Imports.

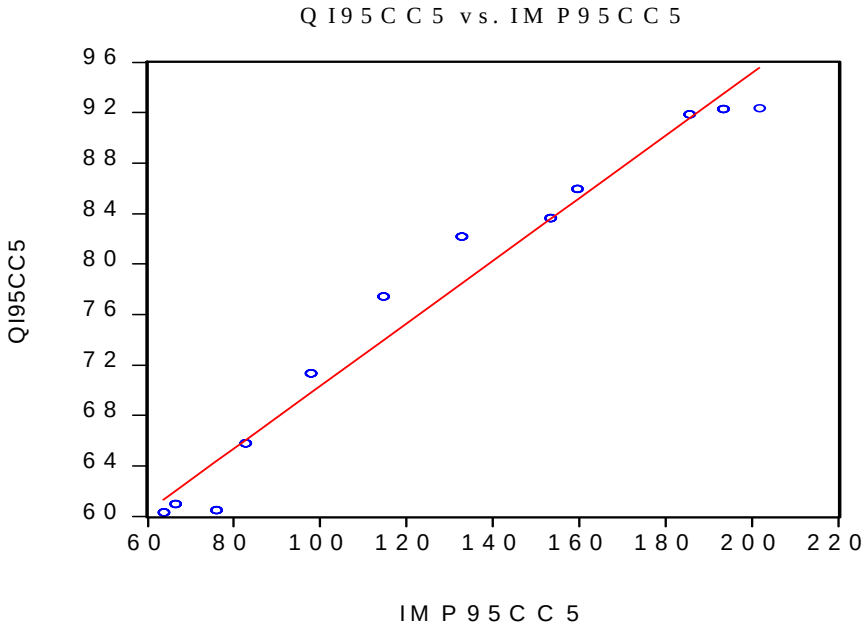
Graph 9.Real Value-Added in Non-Industrial and Industrial Sectors in Central Europe (Bns dollars at 1995 prices and exchange rates)



Graph 10. Real Value-Added of Non Industrial Sectors and Imports in Central Europe (Bns dollars at 1995 prices and exchange rates)



Graph 11. Real Value-Added of Industrial Sectors and Imports in Central Europe (Bns dollars at 1995 prices and exchange rates)



Models 3, 4 and 5, present a comparison of Spain, ES, with the group of 5 Central countries, CC5, for the period 1971-2001, according to data from OECD and some provisional estimations for years with unavailable data, my means of a mixed dynamic model for the total value of QNI, not in per capita terms. Model 3 corresponds to Spain, Model 4, to Central countries, and Model 5 is a pool with both samples. The test of homogeneity of parameters led to the rejection of the homogeneity and thus our conclusion is that it seems that the positive effect of industry and imports on non-industrial sectors was higher in the case of Spain,

Model 3. A mixed dynamic model for QNI in Spain

Dependent Variable: QNI95E				
Method: Least Squares				
Sample(adjusted): 1971 2002				
Included observations: 32 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
QNI95E(-1)	1.013856	0.002970	341.3584	0.0000
D(QI95E)	1.697234	0.366576	4.629960	0.0001
D(IMP95E)	0.237555	0.129821	1.829863	0.0776
R-squared	0.998332	Mean dependent var		392.2531
Adjusted R-squared	0.998217	S.D. dependent var		97.42608
S.E. of regression	4.113686	Akaike info criterion		5.755576
Sum squared resid	490.7499	Schwarz criterion		5.892988
Log likelihood	-89.08921	Durbin-Watson stat		1.358714

Model 4. A mixed dynamic model for QNI in Central countries

Dependent Variable: QNI95CC5				
Method: Least Squares				
Sample(adjusted): 1971 2002				
Included observations: 32 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
QNI95CC5(-1)	0.998331	0.006579	151.7419	0.0000
D(QI95CC5)	0.899360	0.341474	2.633755	0.0134
D(IMP95CC5)	0.207545	0.154833	1.340448	0.1905
R-squared	0.919720	Mean dependent var		198.6732
Adjusted R-squared	0.914184	S.D. dependent var		18.74328
S.E. of regression	5.490736	Akaike info criterion		6.333062
Sum squared resid	874.2973	Schwarz criterion		6.470474
Log likelihood	-98.32899	Durbin-Watson stat		1.383410

Model 5. A mixed dynamic model for QNI, pool of Spain and Central Europe

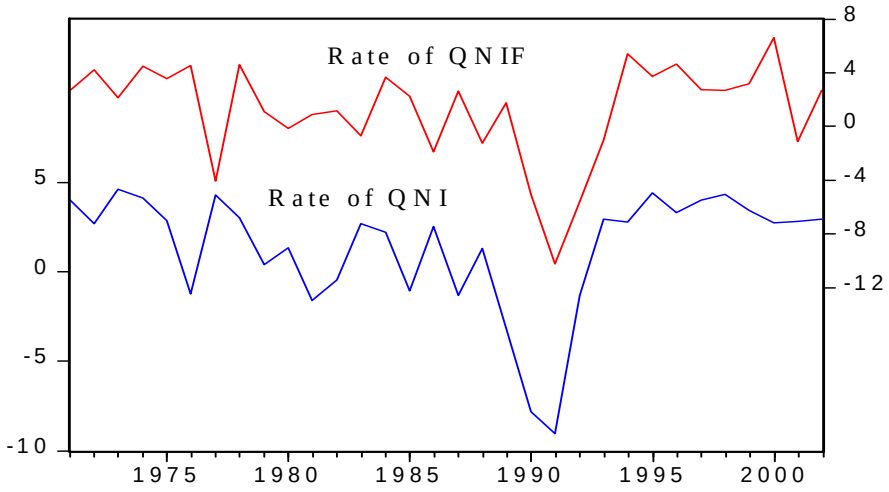
Dependent Variable: QNI95?				
Method: Pooled Least Squares				
Sample: 1971 2002				
Included observations: 32				
Number of cross-sections used: 2				
Total panel (balanced) observations: 64				
White Heteroskedasticity-Consistent Standard Errors & Covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
QNI95?(-1)	1.013704	0.002995	338.4631	0.0000
D(QI95?)	1.050669	0.425431	2.469657	0.0163
D(IMP95?)	0.221451	0.129501	1.710042	0.0923
R-squared	0.997879	Mean dependent var		295.4632
Adjusted R-squared	0.997810	S.D. dependent var		119.8351
S.E. of regression	5.608199	Sum squared resid		1918.566
Log likelihood	-199.6265	F-statistic		14351.92
Durbin-Watson stat	1.003537	Prob(F-statistic)		0.000000

These models present a high goodness of fit and a positive effect of QI and IMP on QNI. The relatively low value of the Durbin-Watson statistic, indicates some degree of autocorrelation which could be probably due to the effect of some missing data. In this regard we consider interesting for future research to include in the equation the increase of Imports of goods (instead of Imports of goods and services) and include also Exports of goods. Models with those variables applied to other countries show a positive coefficient for Imports and a negative coefficient for Exports, being the former higher than the latter in absolute value, what means that the final effect of foreign trade is positive.

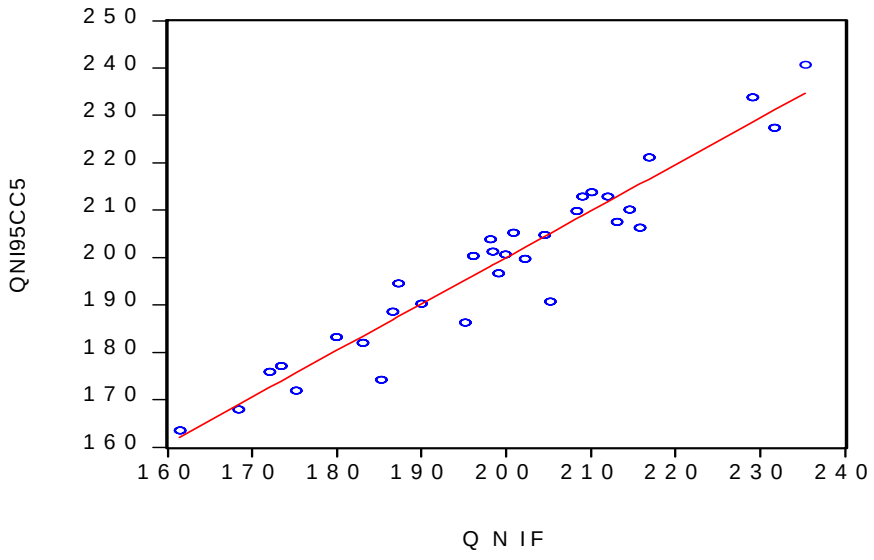
Although the data here used for the group of Central European countries in the period 1970-90 are only provisional estimations, they are enough in our view to show that industry and foreign trade are also in those countries very important to foster the increase of activity in non-industrial sectors, particularly in building and services.

Graph 12 is a plot with dual scale in order to present separately actual values and forecasts. We notice the high degree of correlation between fluctuations of both variables, and graph 13 is a scatter relating actual and forecasted values of QNI in Central Europe. In the case of Spain we also found a high degree of similarity between actual values and forecasts.

Graph 12. Dual plot for the rates of growth actual and forecasted of CC5, model 4



Graph 13. Scatter of QNI and QNIF of Central Europe, model 4



Finally we present the cross correlations between QI and QNI with annual data for the period 1970-2002, which show that QI is a leading indicator in relation with QNI, both in Central Europe and in Spain.

Cross correlation between Industry and Non-Industrial sectors in Central Europe

Sample: 1950 2002
Included observations: 33
Correlations are asymptotically consistent approximations

QI95CC5,QNI95CC5(-i)	QI95CC5,QNI95CC5(+i)	i	lag	lead
. |******** |	. |******** |	0	0.7808	0.7808
. |****** |	. |******* |	1	0.6006	0.6548
. |**** |	. |***** |	2	0.4100	0.5066
. |**. |	. |*** |	3	0.2311	0.3466

Sample: 1970 2002
Included observations: 33
Correlations are asymptotically consistent approximations

QI95E,QNI95E(-i)	QI95E,QNI95E(+i)	i	lag	lead
. |**********	. |**********	0	0.9919	0.9919
. |*********|	. |*********|	1	0.8674	0.8855
. |******* |	. |******** |	2	0.7421	0.7725
. |****** |	. |******* |	3	0.6344	0.6586

We have found similar results for other OECD and non-OECD countries, which show that with annual data cross correlations and analyses of causality usually show that real value-added of Industry is a leading indicator and a cause of real value-added of Non-Industrial sectors.

Regarding causality tests we would like to comment that Granger´s causality test sometimes do not show good results due to an excessive degree of multicollinearity between the values of both variables with the same lag, and results can be improved with a modified version of Granger´s test, presented in Guisan(2003) which includes the explanatory variable with one lag and the lagged value of the explained variable with two lags.

With this modified version we could accept that QI is cause of QNI in this study of Central Europe and Spain. Besides industry we should have into account the role of tourism activities, as in the study of Guisan, Aguayo and Carballas(2004) and other there cited, because at regional level and in small countries these activities could be enough to foster economic development. In big countries tourism contributes to economic development but at a lower extent in relative terms and industrial development usually has the major role.

Regional development in EU accession countries has a lot to do with industrialization when tourism and other services are not enough to guarantee a high degree of development. Industrial development is very much related to educational level of population and to other factors such as geographical situation, and it has important impacts on territorial distribution of development and population as it is shown for the case of 151 regions of Western and Central Europe in Guisan(2004) and Guisan and Aguayo(2004b).

5. Conclusions

1) Our first conclusion is that Industry and Foreign Trade have an important role as causes that explain at a greater extent economic growth and development. In the case of Central Europe in comparison with other countries of Western Europe the main cause of lower development has been the lack of industrial response to the demand side impulse during former socialist system.

2) The analyses of economic growth and cycles in Central Europe and other areas with short term data (monthly and quarterly series usually) present very often Industry as a coincident indicator with economic growth, but this should be considered as a rejection of causality. The effect of industrial stagnation or increase on non-industrial sectors is almost instantaneous in many cases and this make difficult to distinguish industry as the main cause of economic development.

3) Our econometric analysis and comparisons of Central European countries with other EU countries show that Industry and Imports have a positive role to explain the evolution of growth and fluctuations in real Gross Domestic Product. Economic cycles are at a great extent endogenous, because they depend on the evolution of domestic supply and demand, although they are also affected by international contagion through foreign trade of goods and services. When exports of goods and services increases the country has a higher capacity to import and to foster industrial production from the supply side.

4) Our main conclusion is that we should focus on the causes of different evolution in real value-added of Industry and other sectors which have a capacity to generate growth in non-industrial activities. In this regard we consider very important to improve communication among European economic researchers in order to have a higher role in advising public opinion, politicians and EU institutions to foster economic cooperation between Western, Central and Eastern Europe. EU institutions and policies should change, according with the wish of European citizens, to increase employment and real income per inhabitant in all European countries and regions, particularly in those with the lower levels of incomer per capita.

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[2] http://www.worldbank.org/wbi/reducingpoverty/VC_Mar11PolandChile.html

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